

Application No. 10/802,263
Response dated Wednesday, April 12, 2006
Submitted by Louis J. Franco, USPTO Reg. 38,885

Transmitted via facsimile to (571) 273-8300
Reply to Office Action of January 12, 2006
Attorney Phone: 978-582-5550

Amendments to the Claims:

Listing of Claims

1. (currently amended) A directional transition module for moving an article translating on a primary roller conveyor having left and right sides and extending along a first axis to a secondary conveyor for translation along a second axis angularly disposed with respect to the first axis, the directional transition module comprising:
 - a chassis; and
 - a first drive-member set including at least one belt supported by the chassis for cycling through a predetermined driver cycle having an upper cycle portion and a lower cycle portion, the upper cycle portion being such that, when the directional transition module is installed for use in conjunction with the primary roller conveyor, the at least one belt cycles between first and second rollers of the primary roller conveyor, the at least one belt including a first segment and a second segment, the first segment having a profile sufficiently low such that, when the first segment cycles through the upper cycle portion, no section of the first segment extends above a plane defined by the tops of the first and second rollers, and the second segment having a profile sufficiently high such that, when the second segment cycles through the upper cycle portion, at least one section of the second segment extends above the plane defined by the tops of the first and second rollers to engage the article for directional transition[[[.]], wherein at least one of the at least one belts further includes at least one tapered transition region that gradually increases in thickness between the first and second segments.

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2. (original) The directional transition module of claim 1 wherein the at least one belt of the first drive-member set comprises at least two belts and wherein each of at least two of the at least two belts is driven by a drive wheel carried for rotation by a first common drive shaft carrying for rotation the drive wheel of at least one other belt.
3. (original) The directional transition module of claim 2 wherein the first common drive shaft is driven by a motor that is alternatively energizeable for rotation in each of first and second opposite rotation directions such that the directional transition module is a bi-directional transition module adapted to service each of (i) a first secondary conveyor adjacent the left side of the primary roller conveyor and (ii) a second secondary conveyor adjacent the right side of the primary roller conveyor by cycling the belts of the first drive-member set in, respectively, a first cycling direction and a second cycling direction.
4. (original) The directional transition module of claim 1 wherein the at least one belt of the first drive-member set is driven by a motor that is alternatively energizeable for rotation in each of first and second opposite rotation directions such that the directional transition module is a bi-directional transition module adapted to service each of (i) a first secondary conveyor adjacent the left side of the primary roller conveyor and (ii) a second secondary conveyor adjacent the right side of the primary roller conveyor by cycling the at least one belt of the first drive-member set in, respectively, a first cycling direction and a second cycling direction.
5. (original) The directional transition module of claim 1 further comprising a second drive-member set including at least one endless flexible drive member supported by the chassis for cycling through a predetermined driver cycle having an upper cycle portion and a lower cycle portion, the upper cycle portion being such that, when the directional transition module is installed for use in conjunction with the

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primary roller conveyor, the at least one flexible drive member cycles between first and second rollers of the primary roller conveyor, the at least one flexible drive member including a first segment and a second segment, the first segment having a profile sufficiently low such that, when the first segment cycles through the upper cycle portion, no section of the first segment extends above a plane defined by the tops of the first and second rollers, and the second segment having a profile sufficiently high such that, when the second segment cycles through the upper cycle portion, at least one section of the second segment extends above the plane defined by the tops of the first and second rollers,

wherein, (i) the at least one belt of the first drive-member set cycles through the upper cycle portion in a direction orthogonal to the first axis, (ii) the at least one flexible drive member of the second drive-member set cycles through the upper cycle portion in a direction orthogonal to the first axis, (iii) the cycling of the at least one belt in the first drive-member set is independent of the cycling of the at least one drive member in the second drive member set, and (iv) at least one of (a) the at least one belt of the first drive-member set and (b) the at least one drive member of the second drive-member set is alternatively cyclable in each of a first cycling direction and a second cycling direction opposite the first cycling direction such that the directional transition module is a bi-directional transition module adapted to service each of (i) a first secondary conveyor adjacent the left side of the primary conveyor module and (ii) a second secondary conveyor adjacent the right side of the primary conveyor.

6. (original) The bi-directional transition module of claim 5 wherein (i) the at least one belt of the of the first drive-member set and (ii) the at least one flexible drive member of the second drive-member set are driven by, respectively, a first common drive shaft and a second common drive shaft.

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7. (original) The directional transition module of claim 5 wherein (i) the at least one flexible drive member of the second drive-member is a belt and (ii) the at least one belt of each of the first and second drive-member sets is alternatively cyclable in each of a first cycling direction and a second cycling direction opposite the first cycling direction.
8. (currently amended) The directional transition module of claim 7 wherein one of (i) the first and second drive-member sets are serially arranged with respect to the translation direction of an article translating along the primary conveyor[.]; and (ii) drive members of the first and second drive-member sets are alternatingly interspersed.
9. (canceled)
10. (original) The directional transition module of claim 1 further comprising a second drive-member set including at least one endless flexible drive member supported by the chassis for cycling through a predetermined driver cycle having an upper cycle portion and a lower cycle portion, the upper cycle portion being such that, when the directional transition module is installed for use in conjunction with the primary roller conveyor, the at least one flexible drive member cycles between first and second rollers of the primary roller conveyor, the at least one flexible drive member including a first segment and a second segment, the first segment having a profile sufficiently low such that, when the first segment cycles through the upper cycle portion, no section of the first segment extends above a plane defined by the tops of the first and second rollers, and the second segment having a profile sufficiently high such that, when the second segment cycles through the upper cycle portion, at least one section of the second segment extends above the plane defined by the tops of the first and second rollers,

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wherein, (i) the at least one belt of the first drive-member set cycles through the upper cycle portion in a first direction orthogonal to the first axis, (ii) the at least one flexible drive member of the second drive-member set cycles through the upper cycle portion in a second direction anti-parallel to the first direction, and (iii) the cycling of the at least one belt in the first drive-member set is independent of, and mutually exclusive with, the cycling of the at least one drive member in the second drive member set such that the directional transition module is a bi-directional transition module adapted to service each of (i) a first secondary conveyor adjacent the left side of the primary conveyor module and (ii) a second secondary conveyor adjacent the right side of the primary conveyor.

11. (original) The bi-directional transition module of claim 10 wherein drive members of the first and second drive-member sets are alternatingly interspersed.
12. (original) The bi-directional transition module of claim 10 wherein the flexible drive members of the oppositely-cycling first and second drive-member sets are driven by, respectively, a first common drive shaft dedicated to rotation in a single first rotation direction and a second common drive shaft dedicated to rotation in a single second rotation direction opposite the first rotation direction.
13. (original) The bi-directional transition module of claim 12 wherein the first and second drive-member sets are alternatingly interspersed.
14. (currently amended) A bi-directional transition module for changing the translation direction of an article translating on a primary roller conveyor along a first axis by moving the article to a selected one of (i) a first secondary conveyor for translation along a second axis angularly disposed at a first angle with respect to the first axis and (ii) a second secondary conveyor for translation along a third axis angularly disposed at a second angle with respect to the first axis, the directional transition module comprising:

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a chassis; and

first and second drive-member sets, each drive-member set including at least one endless flexible drive member supported by the chassis for cycling through a predetermined driver cycle having an upper cycle portion and a lower cycle portion, the upper cycle portion being such that, when the bi-directional transition module is installed for use in conjunction with the primary roller conveyor, the at least one flexible drive member cycles between first and second rollers of the primary roller conveyor, the at least one flexible drive member including a first segment and a second segment, the first segment having a profile sufficiently low such that, when the first segment cycles through the upper cycle portion, no section of the first segment extends above a plane defined by the tops of the first and second rollers, and the second segment having a profile sufficiently high such that, when the second segment cycles through the upper cycle portion, at least one section of the second segment extends above the plane defined by the tops of the first and second rollers,

wherein (i) at least one of the least one flexible drive members of at least one of the first and second drive-members sets includes at least one tapered transition region that gradually increases in thickness between the first and second segments. (ii) ~~[(i)]~~ the at least one flexible drive member of the first drive-member set cycles through the upper cycle portion in a direction orthogonal to the first axis, ~~[(ii)]~~ (iii) the at least one flexible drive member of the second drive-member set cycles through the upper cycle portion in a direction orthogonal to the first axis, ~~[(iii)]~~ (iv) the cycling of the at least one drive member in the first drive-member set is independent of the cycling of the at least one drive member in the second drive member set and ~~[(iv)]~~ (v) at least one of (a) the at least one flexible drive member of the first drive-member set and (b) the at least one flexible drive member of the second drive-member set is alternatively cyclable in each of a first cycling direction and a second cycling direction opposite the first cycling direction.

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15. (original) The bi-directional transition module of claim 14 wherein the at least one flexible drive member of each of the first and second drive-member sets is alternatively cyclable in each of a first cycling direction and a second cycling direction opposite the first cycling direction.
16. (canceled)
17. (original) The bi-directional transition module of claim 14 wherein each flexible drive member of at least one of the first and second drive-member sets comprises a belt.
18. (original) The bi-directional transition module of claim 17 wherein (i) the at least one flexible drive member of the of the first drive-member set and (ii) the at least one flexible drive member of the second drive-member set are driven by, respectively, a first common drive shaft and a second common drive shaft.
19. (original) The bi-directional transition module of claim 18 wherein, in order to achieve the condition that at least one of (a) the at least one flexible drive member of the first drive-member set and (b) the at least one flexible drive member of the second drive-member set is alternatively cyclable in each of a first cycling direction and a second cycling direction opposite the first cycling direction, at least one of the first and second common drive shafts is driven by motor that is alternatively energizeable for rotation in each of first and second opposite rotation directions.
20. (canceled)
21. (new) A directional transition module for moving an article translating on a primary roller conveyor having left and right sides and extending along a first axis to a secondary conveyor for translation along a second axis angularly disposed with

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respect to the first axis, the directional transition module comprising:

a chassis; and

a drive-member set including at least two endless flexible belts, each belt being supported by the chassis for cycling through a predetermined driver cycle having an upper cycle portion and a lower cycle portion, the upper cycle portion being such that, when the directional transition module is installed for use in conjunction with the primary roller conveyor, each of the at least two belts cycles between first and second rollers of the primary roller conveyor, at least one of the at least two belts including a first segment and a second segment, the first segment having a profile sufficiently low such that, when the first segment cycles through the upper cycle portion, no section of the first segment extends above a plane defined by the tops of the first and second rollers, and the second segment having a profile sufficiently high such that, when the second segment cycles through the upper cycle portion, at least one section of the second segment extends above the plane defined by the tops of the first and second rollers in order to engage the article for directional transition, wherein at least two of the at least two belts of the drive-member set are driven by a common drive shaft.

22. (new) The directional transition module of claim 21 wherein at least one of the at least one belts including first and second segments of, respectively, relatively low and relatively high profile further includes at least one tapered transition region that gradually increases in thickness between the first and second segments.